



File Code: 3420

Date: June 22, 2005

Scott Travis  
Superintendent  
Canyon de Chelly National Monument  
P. O. Box 588  
Chinle, AZ 86503

Dear Scott:

In response to your request of an evaluation by the USDA Forest Service Forest Health Unit (FH) on Canyon de Chelly National Monument, Bobbe Fitzgibbon, FH entomologist, worked with your staff member Tonya Holigay, May 31, and June 1, 2005. The evaluation consisted of surveying the south rim drive, north rim drive and the Defiance Plateau collecting data on the status of the forest, looking at the different pests present and evaluating their impacts.

### South Rim Drive:

- Tunnel and Tsegi Overlooks: Piñon needle scale (*Matsucoccus acalyptus*) was epidemic here, with 65-70% of the piñons missing 20 – 60% of the older foliage (See Figure 1.). Piñon needle scale was epidemic along most of the south rim. Piñon ips (*Ips confusus*) mortality from 2003 was at about 10% in this area. Juniper mistletoe (*Phoradendron juniperinum*) was found on 30-40% of the juniper at these overlooks.



Figure 1 Heavily defoliated piñon from pinon needle scale

- Between White House and Sliding Rock Overlooks: Juniper mistletoe (See Figure 2.) increased to 50-70% of the host species with 10-80% of the crown impacted. Piñon ips mortality from 2003 was between 30-60% of the host type and at Sliding Rock Overlook we saw current tree mortality. Additionally, we saw endemic populations of twig beetles (*Pityotrichus barbatus* or *Pityophthorus spp.*), piñon spindle gall midge (*Pinyonia edulicola*), pitch moth (*Vespamima spp.*), piñon needleminer (*Coleotechnites edulicola*), slight evidence of sawfly (*Zadiprion rohweri*) activity and minor infections of dwarf mistletoe (*Arceuthobium microcarpum*) in the piñon.





**Figure 2. Juniper mistletoe**

- Spider Rock Overlook: Oak seems to be making a recovery from drought induced dieback. There is much new sprouting from roots and healthy foliage.

### North Rim Drive:

- Ledge Ruin and Antelope House Overlooks: Piñon needle scale was noted on a few of the smaller diameter piñon trees, juniper mistletoe was heavy here with 50% crown damage on heavily infected trees (See Figure 3.) and considerable mortality of the type probably due to drought stress and bark beetle attack of infected junipers.



**Figure 3. Heavily infected juniper**

- Mummy Cave and Massacre Cave Overlooks: Some piñon needle scale was noted in the smaller diameter trees and some piñon needleminer in the stand.

### Canyon del Muerto:

- Pine-oak woodlands appear to be recovering from the drought. Oak was sprouting from the roots of trees which had much drought dieback.

## Defiance Plateau at Middle Mesa:

- Our survey followed the main road from Tsaile Lake to approximately Peninsula Windmill beyond Black Rock Butte on Middle Mesa. In this area the forest consistently showed less than 10% damage attributed to insects and disease. There was some old mortality due to ips beetles in both piñon and ponderosa pine, but it was minimal and widely scattered. Widely scattered current mortality of both was recorded as well.
- Status of oaks in area: The following photo (See Figure 4) was taken at the Black Pinnacle Lookout but represents the status of oaks seen in park woodlands.



**Figure 4. Oak recovery**

## Discussion:

Overall your forest condition looks good. Piñon pine and ponderosa pine mortality within the park boundaries seems to have been less than mortality seen on other parts of the Navajo Reservation. Some areas of the reservation, especially the area around Klagetoh and the plateau northeast of the Hopi Reservation, had close to 100 % piñon mortality. In the areas of higher piñon mortality such as noted at Sliding Rock Overlook, the possibility of increased fire danger exists, however, at this time there is little understory or duff to carry a fire.

Piñon needle scale seems to be the only insect in outbreak within the park at this time. During 1998 and 1999 surveys, very little piñon needle scale was observed on the south rim while many of the smaller trees were infested on the north rim. The infestation on the north rim seems to have decreased or remained stable while the infestation on the south rim seems to have increased. Piñon needle scales can be seen on the needles as small black bumps. The scale insects have piercing sucking mouth parts with which they draw sap from the needles, killing them. These insects feed on one year old needles and older. The result is that only the current year needles remain on the trees. Eventually we could expect some tree mortality in the smaller trees and growth loss and predisposition to bark beetles in the larger trees.

Adult females emerge from their waxy covering to mate with winged males in late winter or early spring. Egg clusters are laid at the root collar or under larger branches of the trees. Nymphs emerge from the eggs in about 5 weeks. They crawl to the previous year's needles, insert their mouth parts into the needle, and exude a wax covering over their sessile body.

Some current piñon ips and bark beetle activity in ponderosa pine was observed. Ips engraver beetles have been in outbreak since 2001 in the southwest. This group of beetles is strongly associated with drought stressed trees. The southwest has experienced severe drought conditions since the mid 1990s. The problems have been exacerbated by the development of overly dense stands (due to grazing and fire suppression), with associated competition for moisture and the in-growth of piñon into marginal sites during a very wet period prior to the drought. Southwestern aerial detection surveys in 2004 recorded a significant decrease in ips and other low elevation bark beetle species populations in both piñon and ponderosa pine types.

Piñon ips can be responsible for considerable piñon mortality in the southwest. Adult beetles are small reddish-brown to black cylindrical beetles that feed on the phloem of their hosts. Ips beetles are recognized by a concavity at the rear declivity of the elytra (hardened forewings) which is margined by tooth-like spines. Infested trees can be recognized by reddish boring dust in bark crevices or around the base of the tree. In this genus the male beetles are the first to attack the tree. They form a nuptial chamber; then are joined by multiple females who extend galleries in the phloem making egg niches and laying eggs. Larvae feed out from the egg gallery. As the male beetle penetrates the tree he releases an aggregative pheromone that along with the volatiles from the tree draws other beetles to attack that tree. Eventually the tree becomes girdled when multiple galleries cut through the phloem. Additionally, bark beetles introduce a fungus (*Catalysts spp.*) into the sapwood of the tree clogging that vascular tissue. There are at least 3-4 generations of *Ips confusus* per year, thus new infestations are possible from March to September. Adult beetles hibernate under the bark at the base of the tree from November to March.

Junipers heavily infected with mistletoe were found in a couple areas of the park. Contact Mary Lou Fairweather (928-556-2075) for information and help with dealing with this agent.

Several other agents listed in this report were either at very low population densities or are not considered a significant damage agent in a forest setting or both. If you wish further information on these agents feel free to contact Bobbe Fitzgibbon (928-556-2072).

## Recommendations:

In the general forest area the populations of insects would not indicate treatment at this time. Removal of dead and dying trees for use as firewood by campers and residents would diminish the fire hazard. Removal of ips infested piñon would help to reduce further tree mortality; however, population numbers are not such that extensive tree mortality would be expected at this time. In residential areas, removal of currently ips infested piñon would be recommended to reduce further mortality. Once a tree is infested, nothing can be done to save it. Homeowners may want have residual uninfested trees treated with a chemical spray as a preventative measure if there are additional infested trees in the surrounding area

providing a source of beetles. Piñons around residences infested with piñon needle scale could be treated by the resident as needed. Although there are insecticides registered for use on piñon needle scale, timing of the spray is critical and dependent on knowing the developmental stage of the insect. Destroying egg masses prior to emergence can significantly reduce the populations without the use of chemicals. In mid to late spring, egg masses can be dislodged by a strong stream of water from a garden hose. After spraying the tree, the materials from around the base of the tree should be raked and removed or destroyed.

For assistance with mistletoe and dwarf mistletoe issues, hazard tree issues and riparian area analysis, please contact Mary Lou Fairweather at 928-556-2075. If you have questions concerning this report, please feel free to contact Bobbe Fitzgibbon at 928-556-2072.

Sincerely,

/s/ Bobbe Fitzgibbon  
JOHN ANHOLD  
Arizona Zone Leader Forest Health

cc: Elaine Leslie, Tonya Holigay, John Anhold, Debra Allen-Reid

Cain, R., and Parker, D., 1998. Conifer pests in New Mexico. Rev. ed. (Albuquerque, NM): USDA Forest Service, Southwestern Region. 50 p.

Furniss, R.L. and Carolin, V.M. 1977. Western forest insects. USDA Forest Service Miscellaneous Publication No. 1339. 654 p.